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THE MILITARY EFFECTIVENESS OF NAVAL ENLISTEES SERVING AS MEDICAL SPECIALISTS

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THE MILITARY EFFECTIVENESS OF NAVAL ENLISTEES
SERVING AS MEDICAL SPECIALISTS

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Introduction¹

For the past decade, the Navy Medical Neuropsychiatric Research Unit has conducted studies of the military effectiveness of Navy and Marine Corps personnel. A variety of background history variables and measurements of recruit training adaptation have been found to be related to the effectiveness of personnel during their first enlistments. Variations in personnel effectiveness -- i.e., completion of the first enlistment with a recommendation for reenlistment -- are only minimally predictable, however. It has been hypothesized that one of the reasons why predictor validities are relatively low is the highly variable nature of the military environments in which enlistees serve. It is reasonable to assume that personnel serving in different military environments will have different rates of effectiveness, and it is also possible that variables predictive of effectiveness in one environment are different from those which are predictively valid for another.

For naval enlistees there are several different bases upon which fleet environments can be categorized. One of these is the broad occupational fields which comprise the enlisted rating structure. NAVPERS 18068B defines twelve occupational groups: (1) Deck, (2) Ordnance, (3) Electronics, (4) Precision Equipment, (5) Administrative and Clerical, (6) Miscellaneous, (7) Engineering and Hull, (8) Construction, (9) Aviation, (10) Medical,

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(11) Dental, and (12) Steward. It is differences in the predictability of effectiveness for enlistees serving in these occupational fields which is the general subject of the present series of studies.

In a previous report (Plag, Goffman, Murphy, and Bowen, 1969), enlistees comprising Group 9 (Aviation) were evaluated in terms of their career history, pre-service and recruit training characteristics, and service effectiveness. While airmen were found to be different from other occupational groups with respect to cognitive abilities and rate of effectiveness, predictions of their adaptations were no more valid than those of other enlistees. In other words, knowledge of an enlistee's assignment to the aviation specialty was not found to enhance the accuracy with which predictions of his effectiveness could be made.

It was hypothesized that the above finding was explainable on the basis of the heterogeneity of duties performed by airmen. In other words, although airmen are unique in the sense that they are involved with aircraft, as a group they perform a wide variety of duties which are not unlike those performed by non-aviation personnel. The speculation was made that if enlistee occupation can in fact moderate effectiveness predictions, perhaps it would be more readily identifiable among groups serving in physical environments quite unlike those of other occupational groups. One such group is that composed of medical specialists.

It was the purpose of this study to evaluate the predictability of effectiveness for enlistees serving in medical specialty billets -- those in occupational groups (10) Medical and (11) Dental -- and to contrast effectiveness predictions for these groups with those made for enlistees generally.

In addition, medical specialists were compared with other enlistees on the basis of (a) personal history characteristics, (b) percentages and types of service non-effectiveness, and (c) percentage of personnel reenlisted.

The Research Data

Subjects for this study consisted of enlistees who began their tours of active duty at the two Naval Training Centers at Great Lakes and San Diego during four sampling periods in May, August, and November, 1960, and February, 1961. Medical specialists were defined as those recruit training graduates who completed Hospital Corps and Dental Technicians Schools and were rated as either an HM or DT. Non-medical-specialists consisted of those recruit training graduates assigned to general duty billets or to ratings other than the two listed above.

Biographical data for the sample subjects were obtained from a psychiatric screening questionnaire which is routinely administered to enlisted personnel during their first day in recruit training. These data consisted of the following variables:

- (1) Age at enlistment
- (2) Years of formal education completed
- (3) Number of arrests - for reasons other than traffic violations
- (4) Family stability - the marital status of parents at the time of sailor's enlistment
- (5) Number of school grades failed or repeated
- (6) Number of expulsions or suspensions from school
- (7) Average grade received in school
- (8) Age upon leaving school
- (9) Period of active duty obligation
- (10) Number of siblings
- (11) History of prior-service rejection
- (12) Marital status
- (13) History of previous service
- (14) Religion
- (15) Race

Subjects' scores on five tests of cognitive ability were obtained from records maintained by the classification departments at the two naval training centers. These tests were:

- (1) Armed Forces Qualification Test (AFQT) - a test of mental ability administered to all applicants for service induction and enlistment at the Armed Forces Examining and Entrance Stations.
- (2) General Classification Test (GCT) - a 100-item Navy test of verbal aptitude.
- (3) Arithmetic Test (ARI) - a 50-item Navy test of the ability to perform elementary computations and solve quantitative problems.
- (4) Mechanical Test (MECH) - a 100-item Navy test of mechanical comprehension and tool knowledge.
- (5) Clerical Test (CLER) - a 210-item Navy speeded test of number matching.

Data pertaining to the adjustment and performance of enlistees during recruit training were obtained from files maintained by the training offices of each of the two recruit training commands. These data were the following:

- (1) Number of recruit training transfers - because of performance deficiencies or because of physical illness, recruits may be set back in training or transferred to other training companies. This variable was a measure of the number of times recruits were transferred from one training unit to another.
- (2) Company commander rating of performance - a three-category scale (best ten recruits, average recruits, worst ten recruits) of overall training performance as evaluated by company commanders

at the termination of training. Only those subjects who completed training with their originally assigned companies received a score on this variable. In the data analyses, therefore, recruit training variables 1 and 2 were combined and treated as a single predictor.

- (3) Average weekly test grade - an average of the scores received by recruits on weekly tests measuring knowledge of classroom subjects taught during training.
- (4) Recruit final achievement test score (RFATS) - a score based upon a final examination covering subjects taught during recruit training.
- (5) Recruit disciplinary status - a variable specifying various types of disciplinary action at the regimental level during training.

Throughout the period from 1960 through 1965, the record (Enlisted Master Tape) of active duty enlistees, maintained by the Bureau of Naval Personnel, was examined periodically in order to construct a history of the commands to which the sample subjects had been attached. In addition, the Enlisted Master Tape served as a source of information for determining which subjects had failed to complete their active duty obligations. For those personnel who did not extend their enlistments beyond the first, data pertaining to the cause of separation, the periods of duty served, and commanding officer recommendations for reenlistment were obtained from page DD214 of

their service records.

Statistical Analyses

Medical and non-medical groups of enlistees were compared on the basis of the fifteen personal history variables and the five tests of cognitive ability listed above. Differences between the two groups on the dimensions of service effectiveness and rate of reenlistment were also examined and tested for statistical significance. Some of these comparisons involved discrete data, in which the significance of differences was tested by chi-square, while others involved continuous data and were tested with the t-ratio.

For the prediction of effectiveness, the independent variables consisted of the four measures of recruit training performance as well as the fifteen personal history characteristics and the five tests of cognitive ability. The effectiveness criterion was a dichotomous one. Effective performance was defined as the completion of obligated duty with a recommendation for reenlistment. Non-effectiveness refers to unsatisfactory performance as evidenced by service separation prior to the completion of obligated duty or failure to be recommended for reenlistment. A small group of subjects was dropped from this phase of the analysis because they rendered performances which, due to service-incurred physical disability or death, could be categorized as neither effective nor non-effective.

Two regression equations were derived, one for all enlistees and one for the medical specialists alone. By comparing the two equations it was possible to determine not only if effectiveness for the medical specialists

was more or less predictable than effectiveness for all enlistees, but also whether or not assignment to the medical specialties had the effect of moderating effectiveness predictions. To obtain an estimate of the predictive validity of the derived equations, each of the groups (medical specialists and "all enlistees") was divided into a validation and cross-validation sample. Within each group, the validation and cross-validation samples were selected in such a way that the percentages of effective and non-effective enlistees in the two samples were nearly identical.

For each analysis, the predictor data from the validation sample were analyzed to determine the linearity of the predictor-criterion relationships. Appropriate weights were assigned to segments of those variables found to be markedly non-linear. Pearson product-moment correlations were then calculated between all variables, and a stepwise linear multiple regression procedure was utilized for deriving the prediction equation for each of the subject groups. In each case, the optimum prediction equation which was derived was one in which all the beta weights of the independent variables were significant at or beyond the .01 level of confidence. The derived equation for each group was then applied to the cross-validation sample and predicted criterion scores calculated for each subject. These scores, from the cross-validation sample, were then correlated with the effectiveness criterion and the resulting Pearson r interpreted as representing the predictive validity of the aggregate of enlistee characteristics.

Finally, a comparison was made of the cross-validities of the two prediction equations to determine which of the formulae yielded the higher validity for the medical-specialist group.

Results

Sample. The total research sample numbered 11,008 sailors. Of this group, 639 personnel were separated from service while attached to recruit training commands. Of the 10,369 subjects who graduated from recruit training, 417 were assigned to and graduated from medical specialist service schools (hospital corps school and dental technician school). The remaining 9,952 enlistees were assigned to other-than-medical specialties or to general duty. Of the 417 medical specialists, 364 were hospital corpsmen and 53 were dental technicians.

Effectiveness. Military effectiveness has been defined as the completion of obligated duty with a recommendation for reenlistment. Of the 417 medical specialists, 78 or 18.70 per cent rendered non-effective performances. Of the non-medical specialists, 175 were classified as neither effective nor non-effective or had missing criterion data. Of the remaining 9,777, 2,234 or 22.85 per cent rendered non-effective performances. The difference in effectiveness between the medical-specialist group and the non-medical specialists is significant at the .05 level of confidence. Table 1 shows other differences between the two groups as regards types of non-effective performance.

For the medical specialists, there is no significant difference in effectiveness between corpsmen and dental technicians. Of the 53 dental technicians, 44 (83.02 per cent) rendered effective performances, while 295 (81.04 per cent) of the 364 corpsmen did so.

The findings with respect to effectiveness may be summarized as follows:

- (1) Medical specialists have a higher rate of military effectiveness

Table 1

Numbers of Medical Specialists and Other Enlistees Rendering Various Types of Non-Effective Service

<u>Category</u>	<u>Medical Specialists</u>		<u>Other Enlistees</u>		<u>Difference</u>
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	
I. Total subjects	417	100.00	9952	100.00	$\chi^2 = 2.095$ df = 1 p = N.S.
A. Missing data	0	0.0	49	0.0	
B. Complete data	417	100.00	9903	99.51	
II. Subjects - complete data	417	100.00	9903	100.00	$\chi^2 = 5.381$ df = 1 p = .02
A. Effective or non-effective	417	100.00	9777	98.73	
B. Neither effective nor non-effective	0	0.0	126	1.27	
1. Service incurred physical disability			82		
2. Death			44		
III. Subjects effective or non-effective	417	100.00	9777	100.00	$\chi^2 = 3.928$ df = 1 p = .05
A. Effective - completed tour, recommended for reenlistment	339	81.30	7543	77.15	
B. Non-effective	78	18.70	2234	22.85	

<u>Category</u>	<u>Medical Specialists</u>		<u>Other Enlistees</u>		<u>Difference</u>
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	
IV. Subjects non-effective	78	100.00	2234	100.00	
A. Early separation	64	82.05	1515	67.82	$\chi^2 = 7.020$
B. Completed tour but not recommended for reenlistment	14	17.95	719	32.18	$df = 1$ $p = < .01$
<hr/>					
V. Subjects non-effective by reason of early separation	64	100.00	1515	100.00	
A. Medical (EPTE)	9	14.06	121	7.99	$\chi^2 = 2.936$ $df = 1$ $p = N.S.$
B. Unsuitability	27	42.19	419	27.66	$\chi^2 = 6.360$ $df = 1$ $p = .01$
C. Unfitness	26	40.63	437	28.84	$\chi^2 = 4.069$ $df = 1$ $p = .04$
D. Punitive	1	1.56	281	18.55	$\chi^2 = 12.031$ $df = 1$ $p = < .001$
E. Administrative (C.O.G.)	1	1.56	257	16.96	$\chi^2 = 10.718$ $df = 1$ $p = .001$

than enlistees not in HM and DT ratings.

(2) Corpsmen and dental technicians have similar rates of effectiveness.

(3) Of those subjects who render non-effective performances, medical specialists, in comparison with other enlistees, have a significantly higher rate of early separation. Other enlistees who are non-effective, have a significantly higher percentage of their members who complete their tours of duty without being recommended for reenlistment.

(4) Of those personnel who render non-effective performances as evidenced by early service separation, significant differences exist between medical specialists and others on the basis of the type of discharge received. Medical specialists receive a significantly larger number of unsuitability, and unfitness discharges and a significantly smaller number of punitive and administrative separations than non-medical personnel.

Reenlistment: Only those personnel who complete their periods of active obligated duty and are recommended for reenlistment by their commanding officers are eligible for a second enlistment. For the medical specialist group, the number eligible for reenlistment was 339, while for other enlistees the number was 7,543. Reenlistees in the medical specialist group numbered 96, or 28.32 per cent of those eligible. For other enlistees, the number who reenlisted was 1,527, or 20.24 per cent of those eligible. The difference between the two groups is highly significant statistically ($\chi^2 = 12.941$; $df = 1$; $p < .001$).

Career History: As an example of the types of commands to which medical specialists are attached during their first enlistments, a subsample of twenty subjects was randomly selected from the group of 417

enlistees and a listing made of their duty stations and the time spent at each. Rate changes during the course of the first enlistment were also noted for each subject. The career histories of these specialists are shown in Table 2.

Although data for only twenty subjects may be quite unreliable, the information contained in Table 2 suggests that medical specialists who complete their first enlistments are attached to an average of 1.88 commands following graduation from a Class A service school. The average number of days spent at each duty station is 552. For the subjects in this sample who completed their enlistments, the average number of days spent on active duty from the time of service school completion until termination of their obligation was 1,034 days.

Personal History Characteristics: Medical specialists and other enlistees were compared on the basis of fifteen personal history characteristics and five tests of cognitive ability. Statistically significant differences were found between the medical specialist and other groups on fifteen of these variables. Table 3 depicts these variables and the differences found between the groups.

Prediction of Effectiveness: Of the total group of 10,194 enlistees for whom effectiveness data were available, 5,097 were assigned to the validation sample and 5,097 to the cross-validation sample. For the validation sample, the percentage of effectiveness was 77.32 and for the cross-validation sample, it was 77.30.

For the total group of enlistees, 18 of the 24 predictor variables yielded correlations significantly related to the effectiveness criterion.

Table 2

The Career Histories of a Sample of Twenty Medical Specialists

<u>Subject</u>	<u>Successive Duty Stations^a</u>	<u>Time Attached (in days)</u>	<u>Rate Progression^b</u>
1	School, HC SD	121	HA
	USNH, YOKOSUKA	201	HN
	School, MEDTECH FSS CP LJ	58	
	2nd MDIV FMF LANT	205	
	Discharged, BuPers Code 275, Medical Disqualification - EPTE		
2	School, HC SD	133	HA, HN
	NAS MIRAMAR SD	1077	HM3, HM2
3	School, HC SD	96	HA, HN
	USNH, SD	536	
	USNR, Separated after two years of active duty, BuPers Code 203, Expir- ation of Active Obligated Service		
4	School, HC GL	121	HA
	NAS JACKSONVILLE	1011	HN
5	School, HC GL	118	HA
	NATC NAS JACKSONVILLE	231	
	Discharged, BuPers Code 253, Unfitness, Class II Homosexual		
6	School, HC GL	141	HA
	School, MEDTECH USNH PHILA	207	HN
	AO 39, KANKAKEE	654	HM3
7	School, HC GL	134	HA
	PHIBASE LCREEK	171	HN
	School, MEDTECH PT VA	188	HM3
	USNH, NAS JACKSONVILLE	402	
	AS 32 HOLLAND	426	
8	School, HC GL	120	HA
	USNH, CHELSEA	712	HN
	School, MEDTECH USNH CHELSEA	364	HM3
	CVAN 65 ENTERPRISE	128	

^aFor each subject, duty stations are listed in order - from recruit training graduation to completion of enlistment.

^bRate progression is the order in which rates were held by each subject from recruit training graduation until the end of the enlistment. They do not correspond in time to the subject's duty station.

<u>Subject</u>	<u>Successive Duty Stations</u>	<u>Time Attached (in days)</u>	<u>Rate Progression</u>
9	MSL CEN PT MUGU	137	HA
	School, HC SD	129	HN
	NS SDIEGO	146	HA
	CVA 31 BON HOMME RICHARD	411	HN
	CVA 41 MIDWAY	331	
10	School, HC GL	117	HA
	USNH, PHILA	362	HN
	Discharged, BuPers Code 460, Unsuitability, Emotional Instability Reaction		
11	School, HC GL	140	HA
	USNH, CHARLESTON SC	912	HN
12	School, DEN NTC SD	138	DA
	NAAS NEW IBERIA LA	1194	DN, DT3
13	School, HC GL	134	HA
	USNH, GREAT LAKES	895	HN
14	School, HC GL	112	HA
	ADCOM GLAKES	239	HN
	School, MEDTECH USNH GREAT LAKES	415	HM3
	CB CEN PT HUENEME	362	
15	School, HC GL	135	HA
	USNH, GREAT LAKES	974	HN
16	School, DEN NTC SD	130	DA
	DEN CLIN GTMO BAY	156	DN
	Discharged, BuPers Code 388, Sexual Perversion		
17	School, DEN NTC SD	136	DA
	CVS 36 ANTIETAM	721	DN
	AD 27 YELLOWSTONE	485	DT3
18	School, HC GL	127	HA, HN
	DISP NB NORFOLK	1210	HM3, HM2
19	School, HC GL	126	HA, HN
	DISP NB NORFOLK	1209	HM3
20	School, HC SD	126	HA
	School, FMS CP PENDLETON	40	HN
	1stMDIV FMF PAC	538	HM3
	3rd MDIV FMF PAC	276	HM2
	1st MDIV FMF PAC	312	

Table 3

Personal History Characteristics and Tests of Cognitive Ability
on which Medical Specialists and Other Enlistees
are Significantly Different

Part I - Continuous Variables

<u>Variable</u>	<u>Mean for Medical Specialists</u>	<u>Mean for Other Enlistees</u>	<u>Difference</u>
1. AFQT Score	53.18	51.43	$t = 5.00; p < .001$
2. GCT Score	56.68	50.83	$t = 16.57; p < .001$
3. ARI Score	53.80	50.32	$t = 10.88; p < .001$
4. MECH Score	48.30	50.14	$t = 4.97; p < .001$
5. CLER Score	49.26	46.74	$t = 6.46; p < .001$
6. Age	18.27	18.00	$t = 3.86; p < .001$
7. Education	11.46	10.68	$t = 19.50; p < .001$
8. No. of School Grades Failed	.30	.60	$t = 15.00; p < .001$
9. School Grade Average	74.60	72.40	$t = 7.33; p < .001$
10. Age Left School	17.50	17.13	$t = 7.40; p < .001$
11. No. of Expulsions	.33	.45	$t = 3.00; p < .01$
12. Number of Siblings	2.80	3.24	$t = 4.40; p < .001$
13. Number of Arrests	.22	.29	$t = 2.27; p < .05$

Part II - Discrete Variables

<u>Variable</u>	<u>Percent of Medical Specialists</u>	<u>Percent of Other Enlistees</u>	<u>Difference</u>
14. Active Duty Obligation			
a. 2 years	7.43	9.33	$\chi^2 = 15.53$
b. 3 years	35.73	43.66	$df = 2$
c. 4 or more years	56.83	47.00	$p < .001$
15. Prior Service			
a. No	90.00	92.66	$\chi^2 = 3.94$
b. Yes	10.00	7.34	$df = 1$
			$p < .05$

Those yielding non-significant correlations were: (1) Number of siblings, (2) History of previous service, (3) History of prior-service rejection, (4) Marital status, (5) Religion, and (6) Race. These six variables were omitted from the multiple regression analysis.

The correlations of the 18 valid predictors and the criterion are shown in Table 4. It will be noted in Table 4 that all the predictor validities are positive, even though some of the variables obviously bear a negative relationship to military effectiveness (ex: school grades failed). This situation occurs because of the linearization weights which were assigned to the segments of some of the variables -- ones which otherwise would not be linearly related to the criterion. Actually, the weights assigned to the various segments of each variable are the criterion means for the subjects comprising the variable categories. Enlistees rendering effective service were assigned a value of "1" on the criterion variable, while those who were non-effective were assigned a value of "0". Table 5 shows the weights assigned to the various segments of the predictor variables for the total group.

The multiple regression analysis of the data for the total group yielded eight variables which added uniquely to the prediction of effectiveness. Mechanical Score, Clerical Score, Recruit Disciplinary Status, Recruit Training Transfers - Company Commander Rating, Education, Number of Expulsions and Suspensions, Number of Arrests, and Average Weekly Test Score were the variables whose beta weights were found to be significant at or beyond the .01 level of confidence. This predictor composite yielded a multiple correlation (in the validation sample) of .360. The cross-validity of the

Table 4a,b

Product-Moment Correlations of Predictors Significantly Related to Military Effectiveness -
Total Group - Validation Sample (N = 5097)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Effectiveness																		
2. Age	155																	
3. Active Duty Obligation	145	914																
4. Education	272	496	443															
5. School Grades Failed	122	142	107	482														
6. School Grade Average	115	134	124	267	223													
7. Age Left School	198	549	510	634	150	156												
8. Number of Expulsions	169	171	139	203	126	132	158											
9. Number of Arrests	128	097	089	160	039	089	143	244										
10. Family Stability	076	082	074	137	075	018	095	055	061									
11. AFQT	160	118	093	340	250	186	209	017	022	054								
12. GCT	147	122	079	413	315	213	231	025	029	034	669							
13. ARI	178	107	068	394	294	278	249	052	063	067	588	620						
14. MECH	131	098	056	158	098	038	122	033	006	057	565	372	276					
15. CLER	143	118	092	286	190	128	192	054	052	055	211	219	362	091				
16. R.T. Transfers - C.C. Rating	232	176	141	249	164	158	158	111	077	061	171	188	199	145	159			
17. Aver. Weekly Test Grade	207	156	117	374	282	212	214	050	039	043	537	646	498	351	248	315		
18. RFATS	121	129	089	291	300	101	170	019	-033	013	476	526	361	373	221	122	515	
19. R. Discipline Status	130	081	060	105	078	043	091	091	037	026	035	041	058	059	069	351	101	119

^aDecimal points have been omitted from the correlations.

^bMany of the predictor variables were linearized with the effectiveness criterion. Hence, the validities of all the predictors are positive. Refer to Table 5 for the linearization weights assigned to the segments of some of the variables.

Table 5

Linearization Weights Assigned to Segments of Predictor Variables
Significantly Related to Effectiveness Criterion -
Total Group - Validation Sample

<u>Variable</u>	<u>Segment</u>	<u>Weight Assigned</u>
1. Age	17 years	.701
	18 years or older	.832
2. Active Duty Obligation	3 years (minority)	.704
	2, 4, or 6 years	.827
3. Education	9 years or less	.637
	10 years	.677
	11 years	.739
	12 years or more	.897
4. School Grades Failed	None	.818
	One	.732
	Two or more	.682
5. School Grade Average	A or B	.834
	C	.751
	D or E	.695
	F	.500
6. Age Left School	16 years or younger	.641
	17 years	.785
	18 years or older	.860
7. Number of Expulsions and Suspensions	None	.808
	One	.732
	Two or more	.573
8. Number of Arrests	None	.798
	One or two	.692
	Three or more	.521
9. Family Stability	Parents together or father deceased	.791
	Mother deceased, parents separated or divorced, adopted	.735
	Raised in foster home or orphanage	.637
10. AFQT	Treated as continuous variable	

<u>Variable</u>	<u>Segment</u>	<u>Weight Assigned</u>
11. GCT	Treated as continuous variable	
12. ARI	Treated as continuous variable	
13. MECH	Treated as continuous variable	
14. CLER	34 or lower	.605
	35-44	.737
	45-49	.772
	50-54	.809
	55 or higher	.861
15. Recruit Training Transfers - Company Commander Rating	0 Transfers - CC upper ten	.879
	0 Transfers - CC average	.812
	(0 Transfers - CC lower ten)	.668
	(1 or 2 Transfers)	
	3 Transfers	.586
	4 or more Transfers	.303
16. Average Weekly Test Grade	Treated as continuous variable	
17. RFATS	Treated as continuous variable	
18. Recruit Discipline Status	No disciplinary action	.785
	Warning given	.641
	Action taken	.508

prediction equation was .351, with a standard error of estimate of .3922. The means, standard deviations, raw-score regression weights, and standard score regression weights (beta weights) of the eight variables comprising the regression equation for the total group are listed in Table 6. It should be pointed out that some of the statistics listed in Table 6 are based upon the linearization weights assigned to the various segments of some of the predictors, not upon the raw predictor values.

The total sample of medical specialists numbered 417 enlistees. Two hundred and twelve comprised the validation sample and 205 were used as the cross-validation sample. In the validation and cross-validation samples, the percentage of effectiveness was 82.55 and 80.00, respectively.

For the medical specialists, only nine of the 24 predictor variables yielded correlations significantly related to effectiveness. These were: (1) Mechanical Score, (2) Recruit Training Transfers - Company Commander Rating, (3) Marital Status, (4) Education, (5) Family Stability, (6) Number of Siblings, (7) Number of Arrests, (8) Race, and (9) Average Weekly Test Grade.

The correlations of the nine valid predictors and the criterion for the medical specialists are given in Table 7. Table 8 shows the linearization weights which were assigned to the various segments of the predictor variables for this group. The multiple correlation of these variables (in the validation sample) was .364. Only three predictors yielded beta weights significant at or beyond the one per cent level of confidence. These three were: (1) Recruit Training Transfers - Company Commander Rating, (2) Number of Arrests, and (3) Average Weekly Test Grade. Table 9 gives the statistics

Table 6

Statistics of Variables Comprising Regression Equation for
Predicting Effectiveness for Total Group (Validation Sample, N = 5097)

<u>Variable</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Raw-Score Regression Weight</u>	<u>Standard-Score Regression Weight</u>
1. MECH	50.0240	7.7878	.0029	.0546
2. CLER	.7745	.0596	.3110	.0443
3. Recruit Discipline Status	.7730	.0542	.3464	.0448
4. Recruit Transfer - Company Commander Rating	.7729	.0972	.5414	.1256
5. Education	.7734	.1136	.5915	.1605
6. Number of Expulsions	.7734	.0707	.5658	.0955
7. Number of Arrests	.7743	.0534	.4918	.0627
8. Average Weekly Test Score	30.3346	3.5055	.0078	.0654
9. Effectiveness Criterion	.7732	.4188		

Regression Constant = -1.8135 ;

Table 7a,b

Product-Moment Correlations of Predictors Significantly Related to Military Effectiveness -
Medical Specialist Group - Validation Sample (N = 212)

Variables	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
1. Effectiveness									
2. Marital Status	102								
3. Education	180	-008							
4. Family Stability	133	-037	-011						
5. Number of Siblings	134	142	-028	096					
6. Number of Arrests	225	038	208	075	-043				
7. Race	107	080	093	172	172	056			
8. MECH	148	064	042	-017	-038	-062	-249		
9. Recruit Training Transfers - Company Commander Rating	257	037	106	-006	035	170	072	110	
10. Average Weekly Test Score	208	-015	104	080	-026	024	090	169	112

^aDecimal points have been omitted from the correlations.

^bThe validities of all the predictors are positive because some of the variables have been linearized with the effectiveness criterion. Refer to Table 8 for the weights assigned to the segments of the linearized variables.

Table 8

Linearization Weights Assigned to Segments of Predictor Variables
Significantly Related to Effectiveness Criterion -
Medical Specialist Group - Validation Sample

<u>Variable</u>	<u>Segment</u>	<u>Weight Assigned</u>
1. Marital Status	Single	.817
	Not single (married, separated, divorced, etc.)	1.000
2. Education	11 years or less	.717
	12 years or more	.868
3. Family Stability	Mother dead; father dead	.941
	Parents together, divorced, separated, etc.	.803
4. Number of Siblings	Four or five	.918
	Other (one, two, etc.)	.798
5. Number of Arrests	None or one	.843
	More than one	.333
6. Race	Negro or other	.950
	Caucasian	.812
7. MECH	Treated as continuous variable	
8. Recruit Training Transfer - Company Commander Rating	1 or 2 Transfers	.947
	(0 Transfers - CC upper ten or average)	.842
	(0 Transfers - CC lower ten; 3 or more transfers)	.500
9. Average Weekly Test Score	0 - 29.99	.696
	30.00 or higher	.874

for the three variables comprising this equation. The cross-validity of the predictor composite was .158, with a standard error of estimate equal to .3958.

To summarize, the cross-validity of the equation derived for predicting effectiveness for the total group of enlistees was .351, while the cross-validity of the equation derived for the sample of medical specialists was only .158. Also, the standard error of estimate for the total group prediction was found to be lower than that for the medical specialists. In other words, the effectiveness of all naval enlistees as a group is more predictable than the effectiveness of medical specialists alone.

As a test of the hypothesis that differences in the military environments of medical specialists and other enlistees might serve to moderate effectiveness predictions, a comparison was made between the cross-validity of the total group equation and the medical specialist equation for predicting effectiveness among members of the medical specialist group. It was found that the total group equation yielded a cross-validity of .205, while, as noted previously, the medical specialist equation produced a cross-validity of only .158. In other words, effectiveness predictions for the medical specialist group are not enhanced through the use of variables uniquely valid for that group.

Discussion

The major purpose of this investigation was to evaluate whether the medical occupational specialty might act as a moderator of the military effectiveness predictions for Navy enlisted personnel. Formulae were derived

Table 9

Statistics of Variables Comprising Regression Equation for Predicting Effectiveness
for Medical Specialists (Validation Sample, N = 212)

<u>Variable</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Raw-Score Regression Weight</u>	<u>Standard-Score Regression Weight</u>
1. Recruit Transfers - Company Commander Rating	.8256	.0979	.7989	.2056
2. Number of Arrests	.8284	.0852	.8312	.1861
3. Average Weekly Test Score	.8258	.0793	.8684	.1809
4. Effectiveness Criterion	.8255	.3805		
			Regression Constant =	-1.2398

for forecasting the effectiveness of all enlistees -- without consideration of their occupational specialties -- and for enlistees in medical specialty ratings only. Predictions of the effectiveness of medical specialists were found to be no more valid when made on the basis of variables uniquely predictive for personnel in those specialties than when made on the basis of variables valid for all enlistees. The conclusion to be drawn from this finding is that membership in the medical specialties is not a moderator of effectiveness predictions. In other words, knowledge that a particular enlistee has been assigned to a medical specialty does not enhance the accuracy with which predictions of his service effectiveness can be made.

It is difficult to explain this negative finding. Apparently the predictors evaluated in this study are not specifically linked to occupational specialty. Seemingly, they possess general predictive value and are valid regardless of the fleet environments to which enlistees are assigned. Perhaps occupational specialty would be a moderator of fleet effectiveness if variables measuring specific psychological traits, such as personality attributes and vocational interests, were to be studied as predictors. At least it would be reasonable to assume that enlistees assigned to occupational specialties which are alien to their interests would experience more problems in adaptation than enlistees working in vocations requiring attributes in keeping with their psychological dispositions.

Several of the other findings of this study deserve comment. The results indicate that medical specialists have a higher rate of effectiveness than other enlistees. This is not caused by peculiarities in the specific military environments in which they serve. Rather, it is dependent upon

those cognitive factors used for selecting medical specialists. At least average cognitive ability (GCT score plus ARI score must be equal to or greater than 100) is required for assignment to Hospital Corps and Dental Technician schools. These variables are in turn positively correlated with other characteristics (education, number of school expulsions, etc.) predictive of successful adaptation and performance. In other words, it is probable that medical specialists would have higher than average rates of effectiveness even if they were serving in non-medical specialties.

It is also of interest to note that the reasons for non-effectiveness among medical specialists are different from those for other enlistees. Medical, unsuitability, and unfitness discharges predominate as the major reasons for non-effectiveness among medical specialists, while punitive and administrative separations occur very infrequently. For other enlistees, however, punitive and administrative discharges represent more than a third of the early service separations. It is not peculiar to find that medical specialists tend to follow medical, particularly psychiatric avenues when early service separation is required. On the other hand, there is a suggestion in these data that psychiatric problems may be more pronounced for enlistees in the medical specialties than for personnel in other occupational groups. Other data (Plag, Arthur, and Goffman, 1967) support this contention and possibly suggest the need for more careful scrutiny and screening of potential medical specialists for the purpose of identifying and eliminating those enlistees with pathological personality characteristics.

The data contained in this report should be interpreted with caution because the sample subjects may not be representative of enlistees entering

service at the present time. For example, it is known that enlistees entering the service since 1965 possess higher basic battery scores and have gone further in school than those personnel who entered service in 1960. As a result, the rate of military effectiveness of enlistees presently serving in their first enlistments is probably considerably higher than it was five to ten years ago. Also, a very high percentage of the medical specialists entering service since 1965 have been attached to the Fleet Marine Force and have seen combat duty in Vietnam. Obviously, the effectiveness of these enlistees cannot be judged on the basis of the data contained in this report.

Summary

A sample of 10,369 enlistees who entered the naval service in 1960 and subsequently graduated from recruit training were divided into two groups -- those assigned to medical specialties and those assigned to other occupational ratings. The two groups were compared on the basis of biographical data, cognitive test scores, rate of effectiveness, and rate of reenlistment. Formulae were derived for predicting effectiveness for all enlistees and for the medical specialists alone. These formulae were compared in order to ascertain whether assignment as a medical specialist might have a moderating effect upon the predictive validities obtained.

The major findings were these:

(1) Medical specialists (hospitalmen and dental technicians) have a higher rate of effectiveness than enlistees in other occupational specialties or in general duty billets.

(2) The reasons for non-effectiveness among medical specialists are different than those for other enlistees. Medical specialists receive a

significantly larger percentage of unsuitability and unfitness discharges and a significantly smaller percentage of punitive and administrative separations than non-medical personnel.

(3) The rate of reenlistment, in terms of those eligible, is higher for medical specialists than for non-medical personnel.

(4) Medical specialists, because of the selection standards, have higher cognitive abilities than other enlistees. They also tend to be slightly older, have completed more formal education, have fewer expulsions from school, and have a more favorable arrest history.

(5) The prediction of effectiveness for medical specialists is not enhanced through the use of variables uniquely valid for that group. In other words, the most valid prediction of the effectiveness of medical specialists utilizes the same variables which are valid for predicting the military effectiveness of all enlisted personnel.

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